

Claims

1. Clutch, comprising a housing (1), an input shaft (2) and an output shaft (3) rotatably supported with respect to the housing (1), a drive gear set (4) and a control gear set (5) each comprising a first gear (6, 7), a number of pinion gears (8, 9), a carrier (10, 11) onto which the pinion gears (8, 9) are mounted, and a second gear (12, 13), each pinion gear (8, 9) meshing with the corresponding first gear (6, 7) and second gear (12, 13) of the gear set (4, 5), as well as control means (14) for influencing the rotation of a first gear (7) or a second gear (13) of the control gear set, wherein the first gear (6) of the drive gear set (4) is connected to the input shaft (2), the carrier (10) of said drive gear set (4) is connected to the output shaft (3) and the second gear (12) of said drive gear set (4) is connected to the carrier (11) of the control gear set (5), the first gear (7) of the control gear set (5) being connected to the output shaft (3) and the second gear (13) of said control gear set (5) being connected to the control means (4).

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2. Clutch according to claim 1, wherein a coupling mechanism (15) is provided for selectively establishing a rotatable or a non-rotatable connection between the input shaft (2) and the output shaft (3).

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3. Clutch according to claim 2, wherein the coupling means (15) are associated with the first gear (6) of the drive gear set (4) and the second gear (13) of the control gear set (5).

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4. Clutch according to claim 3, wherein the first gear (6) of the drive gear set (4) and the second gear (13) of the control gear set (5) have facing surfaces (17, 18) which each carry a part of the coupling means (15).

5. Clutch according to claim 4, wherein the coupling means (15) comprise radially extending ridges and grooves (19).

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6. Clutch according to claim 3, 4 or 5, wherein the first gear (6) of the drive gear set (4) and the second gear (13) of the control gear set (5) are axially moveable with

respect to each other for transferring said gears (6, 13) between a coupled and an uncoupled condition.

5        7. Clutch according to claim 6, wherein the first gear (6) of the drive gear set (4) and the second gear (13) of the control gear set (5) are spring biased towards each other.

10      8. Clutch according to claim 7, wherein an electromagnetic actuator (20) is provided for moving the first gear (6) of the drive gear set (4) and the second gear (13) of the control gear set (5) away from each other against the biasing force.

15      9. Clutch according to claim 8, wherein the coil (21) of the actuator (20) is connected to the housing (1), and the armature (22) thereof is connected to the second gear (13) of the control gear set (5).

10      10. Clutch according to claim 9, wherein the second gear (13) of the control gear set (5) is supported rotatably with respect to the output shaft by means of a disc member (23), said second gear (13) also being axially slidably with respect to said disc member (23).

20      11. Clutch according to claim 10, wherein the disc member (23) is positioned at the side of said the second gear (13) facing away from the coupling means (15), the armature (22) protruding through the disc member (23) and the biasing means (24) being provided between the disc member (23) and said second gear (13).

25      12. Clutch according to any of the preceding claims, wherein the first gear (6) of the drive gear set (4) and the carrier (11) of the control gear set (5) are rotatably supported with respect to each other, e.g. by means of a rolling element bearing (25).

30      13. Clutch according to any of the preceding claims, wherein the first gear (6) of the drive gear set (4) is connected to the input shaft (2) through a spring damper (26).

14. Clutch according to any of the preceding claims, wherein the control means (14) comprise an electric motor, the stator (27) of which is connected to the housing (1) and the rotor (28) of which is connected to the second gear (13) of the control gear set (5).

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15. Clutch according to any of the preceding claims, wherein the first gear (6) of the drive gear set (4) has means, e.g. an external toothed ring (29), for engagement with a starter motor.

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16. Clutch according to any of claims 1-14, wherein the first gear (6) of the drive gear (4) is connected to the rotor (30) of a starter motor (31), the stator (32) of which is connected to the housing (1).

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17. Clutch according to any of the preceding claims, wherein the first gear (6) and the second gear (12) of the drive gear set (4) are face gears.

18. Clutch according to any of the preceding claims, wherein the control gear set (5) is a planetary gear set, the first gear being the sun gear (7) and the second gear being the ring gear (13) of said planetary gear set (5).

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19. Clutch according to any of the preceding claims, wherein a sensor, for instance an encoder sensor is provided for providing information to the control means.

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20. Clutch according to any of the preceding claims, wherein different modules are applied e.g. a clutch module, a damper module, a balancing module, etc.

21. Clutch according to any of the preceding claims, wherein several parts can be made of metallic or non-metallic components, composite, powder, sheet metal material components etc.